

Ruddiman Creek Sediment Cleanup Project A Photo Journal



The U.S. Environmental Protection Agency and the Michigan Department of Environmental Quality have partnered to fund the removal of contaminated sediments in Ruddiman Creek.



The EPA is funding two thirds and the DEQ one third of the project cost, about \$10 million.



Environmental Quality Management, "EQ", is the EPA's construction contractor that is responsible for implementing the cleanup plan which was designed by Earth Tech.



Great Lakes Dock & Materials, a Muskegon firm, is the "off shore" contractor. In other words this contractor will do the dredging in the Ruddiman Pond from a barge.



Jackson-Merkey Contractors, another local firm, is doing all the dry land dredging, that is, excavating sediments from the creek bed.



To accomplish sediment removal in the Pond, Ruddiman Creek was dammed up near the Lakeshore Drive bridge so that the water level was raised about 2 feet. This allowed barges and a tug to be floated.



A tug and barge operation removes sediment from the Pond. The majority of contaminated sediment is located in the Pond.



A back hoe with a clam bucket digs up sediment from the Pond bottom and deposits on a barge. The little red tug moves barges back and forth to a loading dock.



The red back hoe removes sediment from barges and mixes a drying agent, "Calciment", to convert the wet sediment into sludge. Steam is produced by a heat-producing reaction of the Calciment with the water in the sediment. The back hoe also loads a dump truck which hauls the sludge to the next process.



The dump truck hauls the freshly-treated sludge to a drying bed. The steam is created by the heat reaction of the drying agent.



The sludge is allowed to drain and dewater in the drying bed. The purpose is to create a sludge that is dry enough to haul away and landfill.



Large amounts of Calciment, a substance resembling Portland Cement, are used to as a drying agent to dewater and harden the contaminated sediment that is dredged from the creek.



Here a pile of well-dried sludge (formerly sediment dredged from the creek) is ready to be loaded into large trucks for hauling to Ottawa Farms Landfill for final disposal.



Here we see a drying bed being constructed. First a layer of sand is laid down as a foundation. Concrete blocks are arranged around the perimeter. The blocks have tongue and groove joints.



Then a waterproof layer of heavy plastic membrane is laid down as a barrier to leakage.



A worker takes great care to heat-seal membrane joints by warming the fabric with a torch.



Porous plastic pipe is laid on top of the waterproof membrane. All drainage from the sludge is collected in this pipe and pumped to a treatment plant.



All drainage from sludge drying beds and any other source of contaminated water from sediment removal operations is collected and pumped to this treatment system. The contaminated water is treated here to a level that is acceptable to the Muskegon County Wastewater Facility. The treated water from this equipment is pumped to a nearby sanitary sewer manhole where it goes to the County for final treatment. An automatic sampler (box at the far left of the picture) takes samples for analysis and quality control.



Sediment removal operations on the upstream reaches of Ruddiman Creek involve controlling the creek flow so that the stream can be temporarily diverted from its normal channel. Here we see the 100-inch storm sewer outfall that is the headwaters of Ruddiman Creek. A temporary dam of sheet piling holds back some of the flow.



Here Jackson-Merkey workers are preparing this reach of the creek for sediment excavation.



In order to gain access to the upstream creek sections, a temporary haul road is constructed. Since the creek bed is quite soft, "swamp maps" are used to construct the road.



Here are rolls of "swamp mat" material. These are rolled out on the soft creek bottom to make a base for the road.



Gravel is put on the mats next and then large timbers are laid on top of the mat to support the weight of vehicles.



The creek is dammed up and diverted through a culvert.



Here the creek has been diverted to a new channel so that the original channel which contained contaminated sediments can be excavated.



Here is the new creek channel viewed downstream of the diversion culvert. Note the timbers of the haul road on the right side.



Here is a section of original streambed that has been excavated to a depth that should remove the contaminated sediment that was present. This section will then be sampled to prove that all contaminated sediments are removed. Note that sheet piling is installed in the background to protect the creek bank from collapse. Note also the pipeline draped over the sheet piling which conveys contaminated drainage from a drying bed. This will be pumped all the way to the treatment plant at the Pond.



Excavation of the streambed is precisely controlled by laser-beam survey equipment. This ensures that the excavation achieves the design specifications.



The EPA, Earth Tech (design engineering) and construction contractors have set up their headquarters in McGraft Park in a field behind the band shell. The EPA and Earth Tech oversee the quality of work and are responsible to not only carry out the sediment removal but complete restoration of Ruddiman Creek sections impacted by this project.



The City of Muskegon's mission is to provide local support while ensuring public safety and protecting municipal infrastructure during this project.